

What is claimed is:

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1. A thin film forming method comprising:  
2 the first step of forming a crystal nucleus of  
3 perovskite structure of an oxide made up of lead and  
4 titanium on a substrate; and  
5 the second step of setting the substrate  
6 having the crystal nucleus at a predetermined  
7 temperature, supplying an oxide gas and organic metal  
8 source gases of lead, zirconium, and titanium diluted  
9 with a diluent gas to the substrate, and forming on the  
10 substrate a ferroelectric film of perovskite crystal  
11 structure of an oxide made up of lead, zirconium, and  
12 titanium at a pressure of not less than 0.1 Torr.

2. A method according to claim 1, wherein  
2 the first step comprises  
3 setting the substrate at the predetermined  
4 temperature, supplying the oxide gas and organic metal  
5 source gases of lead and titanium to the substrate at a  
6 pressure of 0.001 to 0.01 Torr, and forming the crystal  
7 nucleus on the substrate.

3. A method according to claim 1, wherein  
2 the first step comprises  
3 setting the substrate at the predetermined  
4 temperature, supplying the oxide gas and organic metal

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5 source gases of lead and titanium diluted with the  
6 diluent gas to the substrate at a pressure of 0.001 to  
7 0.01 Torr, and forming the crystal nucleus on the  
8 substrate.

4. A method according to claim 1, wherein  
2 the first step comprises  
3 setting the substrate at the predetermined  
4 temperature, supplying the oxide gas and organic metal  
5 source gases of lead and titanium diluted with the  
6 diluent gas to the substrate at a pressure of not less  
7 than 0.1 Torr, and forming on the substrate the crystal  
8 nucleus.

5. A method according to claim 1, wherein  
2 the first step comprises  
3 setting the substrate at the predetermined  
4 temperature, supplying the oxide gas and organic metal  
5 source gases of lead and titanium diluted with a diluent  
6 gas made up of an evaporated gas of an organic solvent  
7 and another gas to the substrate by dissolving at least  
8 one of the organic metal sources of lead and titanium in  
9 the organic solvent and evaporating and supplying the  
10 organic solvent, and forming the crystal nucleus on the  
11 substrate.

6. A method according to claim 1, wherein

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2 the second step comprises  
3 supplying organic metal source gases of lead,  
4 zirconium, and titanium diluted with the diluent gas, to  
5 which an evaporated gas of an organic solvent is added,  
6 by dissolving at least one of organic metal sources of  
7 lead and titanium in the organic solvent and evaporating  
8 and supplying the organic solvent.

7. A method according to claim 1, wherein  
2 the oxidizing gas and organic metal sources  
3 are respectively supplied to the substrate through  
4 different paths.

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8. A method according to claim 1, wherein  
2 the diluent gas is irrelevant to formation of  
3 a ferroelectric film.

9. A method according to claim 8, wherein  
2 the diluent gas is an inert gas.

10. A thin film forming apparatus, comprising:  
2 a sealable reactor in which a substrate as a  
3 film formation target is placed;  
4 evacuating means for evacuating an interior of  
5 the reactor to a predetermined pressure;  
6 first source gas generation means for  
7 generating a lead source gas made up of an organic metal

8 compound containing lead and a titanium source gas made  
9 up of an organic metal compound containing titanium;  
10 second source gas generation means for  
11 generating the lead source gas, the titanium source gas,  
12 and a zirconium source gas made up of an organic metal  
13 compound containing zirconium;

14 oxidizing gas generation means for generating  
15 an oxidizing gas;

16 dilution means for diluting a gas generated by  
17 said second source gas generation means with a diluent  
18 gas;

19 source gas supply means for supplying to the  
20 substrate in said reactor a gas generated by said first  
21 source gas generation means and a gas diluted by said  
22 dilution means; and

23 oxidizing gas supply means for supplying to  
24 the substrate in said reactor an oxidizing gas generated  
25 by said oxidizing generation means.

11. An apparatus according to claim 10, wherein  
2 said evacuating means is capable of evacuating  
3 the interior of said reactor to a pressure of not more  
4 than 0.001 Torr.

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